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Procedia Computer Science 55 (2015) 1366 – 1373

Procedia Computer Science

Information Technology and Quantitative Management (ITQM 2015)

University Level Learning and Teaching via E-Learning Platforms

D. Benta[a], G. Bologa[a], S. Dzitac[a,b], I. Dzitac[a,c] *

[a]*Agora University of Oradea, Department of Social Sciences, Piata Tineretului 8, RO-485526 Oradea, Romania.*
[b]*University of Oradea, Department of Energetics, Universitatii st. 1, RO-485526 Oradea, Romania.*
[c]*Aurel Vlaicu University of Arad, Deparatment of Mathematics and Informatics, Elena Dragoi 2, RO-310330 Arad, Romania.*

Abstract

Web-based adaptive collaborative learning environments are more often used to support face to face teaching activities. This paper describes how the educational process may be improved and students may be motivated to do homework tasks and to attend classes in higher education. We describe the implementation and use of e-learning platforms and present our experience in using such platforms in our faculty. The performance of two groups of students is analyzed. The analysis focuses on two aspects: attendance on classes and homework tasks submission. Therefore, the first group had no contact with e-learning environment and they had to attend classes in a traditional way (face-to-face interaction) and to submit their homework via e-mail. The second group had to attend classes and also to use an e-learning platform where they could access course resources and homework tasks. They had also to submit their homework via the platform, while respecting a strict deadline and using the professors' feedback to improve their homework quality. This paper highlights the importance and the benefits of using collaborative e-learning platforms in higher education to support face to face teaching.

Peer-review under responsibility of the Organizing Committee of ITQM 2015

Keywords: Course Management System; Moodle; e-learning; higher education; homework.

1. Introduction and literature review

Technology plays a large role in many aspects of day-to-day life, and its importance for education is no different. Technology is rapidly changing the way students learn and how instructors teach. There are many reasons for the growth of the higher education e-learning industry, both from the institutions' and students' perspectives. Globally, the demand for post-secondary education is increasing. With the limited capacity of existing classrooms at academic institutions and the prohibitive cost of building new facilities, e-learning is an attractive alternative [20]. In an effort to remain competitive and maintain their market share, many traditional

* Corresponding author. Tel.: +40359101032.; fax: +40359101032.
E-mail address: rector@univagora.ro.

Peer-review under responsibility of the Organizing Committee of ITQM 2015
doi:10.1016/j.procs.2015.07.123

higher education institutions have expanded their offerings to include e-learning courses to compete with the growing number of virtual higher education institutions [8]. In doing so, they can use their brand names to expand their target market internationally in order to capitalizing on excess demand that exists in the education systems of other countries. In addition, increasing the use of information systems within educational institutions also provides an opportunity for the organizations to reengineer their existing time and paper-intensive processes to improve their overall efficiency. From a student's perspective, the knowledge economy creates a great need for continuous training and upgrading of skills [8]. E-learning makes it possible for this lifelong learning to occur as a part of the student's everyday life, removing the need to travel to a traditional institution or be confined to a specific class schedule.

In the literature, it is often considered that the pedagogical processes have a number of dimensions such as: opportunity for use, quality of knowledge gained, and student's level of acceptance. There have been a variety of studies focusing on the acceptance of e-learning by students [23] discussing the opportunities of using e-learning in pedagogical processes [11] comparing e-learning versus traditional learning on the acquisition and retention of knowledge, e.g., Fernández Alemán et al. [7], and evaluating the quality of knowledge gained by the students through the use of e-learning and the level of student's acceptance of e-learning, e.g., Kelly et al. [9]. As Vavpotič et al. [18] suggested, all the three dimensions must be considered concurrently in order to have an accurate picture on the benefits of e-learning on learning.

In editorial guest of Chen et al. [5] it is presented the work of several scholars that are interested in the field of e-Learning. Among them, Chai et al. [4] reviewed papers that had investigated Information and Communication Technology (ICT) integration using technological pedagogical content knowledge (TPACK), a framework for the design of teacher education programs. They found positive results in enhancing teachers' capacity to integrate ICT for instructional practice.

Paper of Bogdanov et al. [3] is focus on improving the e-learning via personal learning environments through widget spaces in Moodle.

A large number of commercial or open source Learning Management Systems (LMSs) are widely used to assist teaching activities. LMSs are the most representative e-learning applications.

Some are open source software, others are commercially provided. They can be used for distance-learning and as a supplement to in-class lectures, on which course announcements, homework assignments, lecture notes and slides can be posted, for Internet access. These days, we observe a movement in higher education leading from proprietary software to open source, for e-learning applications. In fact, open source software development can provide the necessary flexibility to combine languages, scripts, learning objects and lesson plans, effectively, without the cost and rigidity of proprietary packages of R. Williams [21].

As well described by Psaromiligkos et al. [14], LMSs support a number of features as: Course Management, Class Management, Communication Tools, Student Tools, Content Management, Assessment Tools, and School-Management. Developed by an extremely active open source community, Moodle is a popular Course Management System (CMS) that is ideal for creating dynamic online learning communities and for supplementing face-to-face learning. There are a number of characteristics why we considered Moodle to be a good fit for our requirements. Moreover, it can compete with the big commercial systems in terms of features sets and is easy to extend. Our opinion is that a model best fits the university requirements if it serves to produce benefits and improve the teaching process. Tuparova, D. and Tuparov, G. [17] offer an "approach for management of student participation in collaborative activities and techniques in open source e-learning environment".

The implications in terms of using Moodle in higher education are reflected in previous papers [6], where the authors state that this platform improves teaching and the learning process and they make several considerations in terms of "causal relationships between perceived usefulness, perceived ease of use and actual usage behavior". Mentioned research is based on the Technology Acceptance Model (TAM), as main theory how users come to accept and use a technology. Another study with the theoretical grounding of the TAM was performed earlier by Ong and Lai [12]; TAM is also the basis for the Computer Based Assessment Acceptance Model (CBAAM) that is proposed by Terzis and Economides [16].

Therefore, we used Moodle as e-learning platforms to support face to face training. There is a great number of authors that found Moodle a very productive CMS. Moreover, Moodle was utilized in teaching various domains such as Physics [10] or foreign languages [22]. Roßling and Vellaramkalayil [15] improved systems and have created prototypes for integrating hypertextbook in Moodle LMS.

We consider that Moodle was a stable solution that best fit our requirements. In our study, we consider that, using the e-learning platforms, in course communication, group development and homogeneity had an essential role [2]. A study that shows the importance of e-learning and benefits of using Moodle platforms in teaching activities in Romania was conducted by Paragina et al. [13]. Also, in a recent paper [1] we've presented our experience in using e-learning platforms to support face to face instruction in higher education.

In our case, the need to use such an e-learning platform, came after we have observed a lack of students' interest in terms of homework tasks performed and course participation. Current trends in educational practices proved an increasing tendency to gain benefits from using e-learning platforms to support face to face teaching activities in a collaborative learning environment.

This paper is structured in 4 main sections, including first section with introduction and literature review. Second section describes methods and materials user for this study and third section is dedicated to results and discussions. Final section is for concluding remarks.

2. Methods and Materials

Through implementation of an e-learning platform we wanted to reach significant improvements in the performance and course attendance of students at classes. Our results are presented in the following paragraphs. This additional help in teaching should develop intellectual and practical skills for lifelong learning.

To compare the results from traditional teaching and the e-learning way, we used two groups of students with same number of registered students from same faculty, attending same discipline (same year of study class divided in groups). The first group of students had to do their homework in a so called "traditional" way by submitting them via e-mail. The second group of students had to submit homework using the Moodle e-learning platform we configured. Beside their homework performance, we have also observed their course attendance and their motivation in solving homework tasks.

For this analysis, server logs are used. Data was collected during 2nd of March 2012 and 18th of June 2012. A number of 6984 records were stored during the mentioned period.

As e-learning platform we installed Moodle 2 on our servers with PHP 5 and MySQL 5 support. The course configuration and its sections, for second group, are presented in the figure below. It was a two steps activity: design of the course and users enroll (including accounts creation).

The course format was a Topic format course with specific tasks to complete after each face to face activity. Resources were added and homework tasks were assigned. For resources we used file format, folder format and URL format. For homework tasks we used only assignments with advanced uploading of files (assignment) option (Figure 1). Each homework task had to be solved between face-to-face teaching activities and each of them had a strict deadlines. We choose to allow late submission of homework files. In this case, we agreed for penalties, each day of delay was punished with one point in homework mark. Files for sharing were previously prepared (materials for these classes).

After we designed the course and allocated the resources, we have proceeded to account creation and participants enrollments. The professor's account was created manually while the students' accounts were created using import procedure. A username and password was assigned to each student. The list of students was provided by faculty secretary and for passwords we generated random passwords as concatenation between a word (with uppercase letters and lowercase letters), a symbol and a random number generate in Excel with "rand()" function. The list was stored in an Excel file. Last row from the Excel file was a concatenated row with all the information separated by comma.

The final row was copied in txt file for upload. The structure of the uploaded users file was "username,

password, firstname, lastname, email", stored in the txt file. We used the upload user option in site administration from Moodle. After users upload, they were enrolled (as presented in Figure 2) to the course and each participant received via e-mail a username and password in order to be able connect.

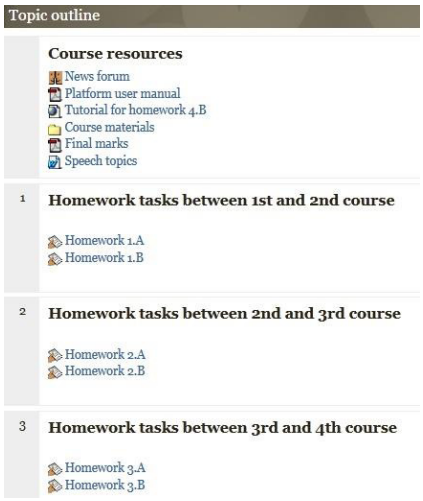

Figure 1. Course structure

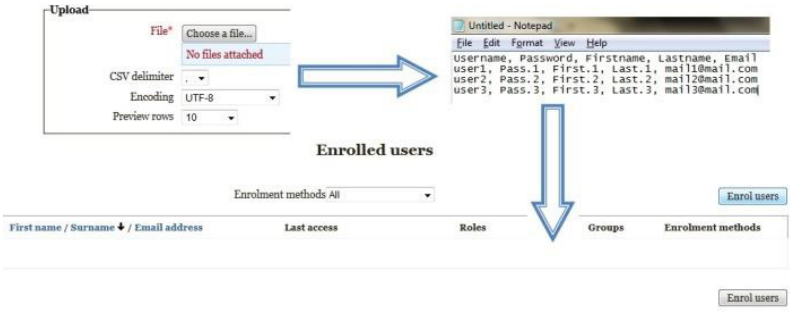

Figure 2. Users enroll procedure

For e-mail sending, we have used the Mail Merge option in Word connected to the Excel database and an Outlook configured e-mail. All the upload users procedure, enroll and sending the individual emails with username and password was a maximum one hour activity for approx. 100 accounts. This is an appropriate and easy solution to create and assign multiple accounts with "student" role.

After authentication, each student has the possibility to change its password. Even if this option is available, very few students changed their account password. One of the main worrying reasons is that after login and after performing their tasks, users didn't log out, they simply close the browser window. A plausible answer would be that they use personal computers and security actions as log out are not really necessary.

3. Results and Discussions

This section describes our results and observations on how the Moodle platform influences the teaching activities. Comparing with the group of students who have participated on traditional courses, the students from

the group who have beneficiated the integration of e-learning had many more improvements. The most important thing was that students' perception regarding homework tasks was changed.

As we have previously mentioned, a server log was used to analyze students' activity on the platform. From the recorded actions (as presented in Figure 3), a high percentage of 77% were students' records. A percentage of 2% was recorded as admin's actions for course design, resource allocation, user accounts upload and enrollments. All the admin' actions were performed using an admin account. The other percentage of 21% was for professor's records. The professor performed a set of operations as assignment update grades (including feedback section – as text of file upload), assignment upload, assignment view, assignment view submission, course reports, course view, users view.

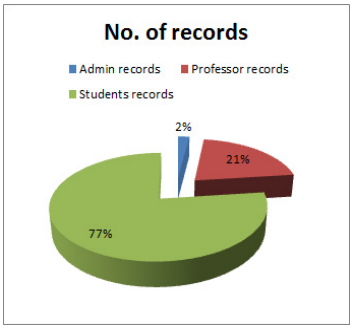

Figure 3. Users activities on platform

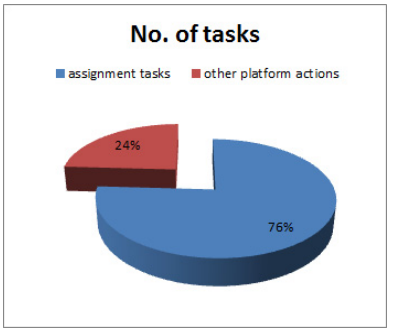

Figure 4. Homework tasks vs. other platform tasks

Most of the performed and recorded tasks on downloaded server log were homework-oriented tasks (the main goal of the configured course). As Figure 4 shows, 76% of the performed tasks were assignment related tasks, while the rest of 24% were other tasks as some of those mentioned like admin and professor roles. Moreover, recordings as resource view, folder view, URL view and forum view were stored (the rest of 24%). This situation resulted from the fact that the platform was installed specially as a support for homework tasks view, solving and submitting in a collaborative and educational manner.

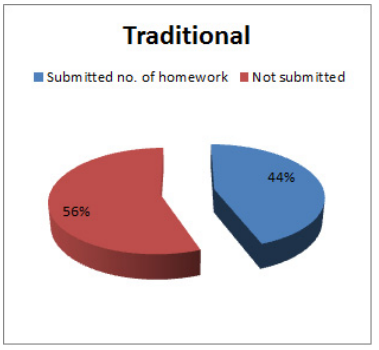

Figure 5. Submitted/Not submitted homework in traditional way

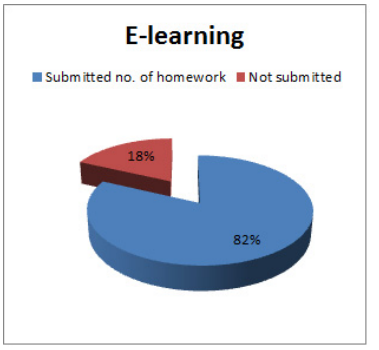

Figure 6. Submitted/Not submitted homework using e-learning

In terms of homework tasks, we have observed that using e-learning platforms we stimulated students to solve homework and increase their course interest.

As a first analysis of the traditional teaching data, we have registered the total number of homework submitted via e-mail. A high percentage of 56% was registered as not submitted homework. The rest of 44% was recorded as submitted homework tasks (Figure 5).

In contrast, when Moodle was used, we registered a higher percentage for submitted homework tasks. As such, a percentage of 82% was stored for the submitted homework, while only 18% was represented by the no submitted homework (Figure 6).

Another important aspect we have observed was that as the deadline approached, there was a higher frequency in platform usage and homework submissions. Initially, homework files were submitted in a preliminary version. After provided feedback, required modification was done, and close to the deadline, final versions were submitted for grading. Only final version homework files were graded (some students took into account the feedback given by the teacher and they improved their homework and some of them not).

Regarding course attendance, we observed that e-learning platforms stimulated students to attend the courses and they were more involved in activities than those from the traditional teaching way group. A comparison is presented in the figures below. In traditional teaching way with no e-learning support, students registered a participation rate of 83%, while rest of 17% didn't attended courses (Figure 7).

On the other side, when e-learning environments were used, we observed a higher course attendance. From the total number of enrolled students, only 2% were absent, the rest of 98% attended the courses (Figure 8) and enjoyed the approach to the courses in our faculty.

The class attendance subject is a very sensible one. Some faculties require class attendance while others do not. In many cases, attendances are counted positively in grade determination or, opposite, lack of attendances are counted against grade determination.

According to our expectations, we have recorded a higher course attendance when the e-learning platform was used. As we offered an alternative way to study, students preferred to attend classes to gather information rather that self-study even if most of them were employed.

There is a variety of ways to encourage class attendance and using such a platform is one of them. Also, class attendance and class activities are successful means of improving the value of the course. This platform stimulates students' creativity and curiosity. They also found it very intuitive and easy to use.

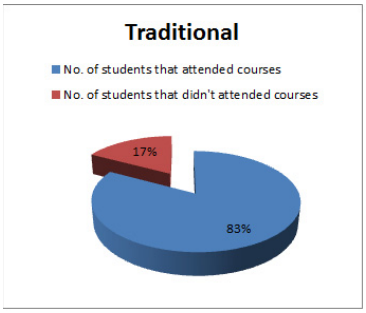

Figure 7. Participation rate in traditional way

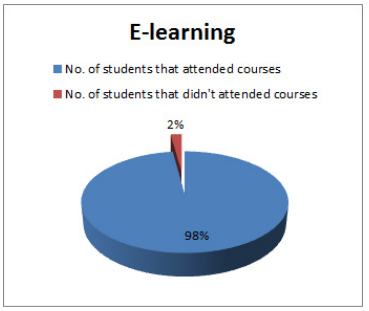

Figure 8. Participation rate using e-learning platform

We consider that our results are looking like this also because of the modality we have presented the evaluation strategy at the end of semester (their final mark). During the first meeting, we have presented the homework tasks and gave some other important information. For example, we explained that the attendance to classes will help students to solve a homework task in time t after a lecture attendance time v. Lack of attendance means that a student will solve the homework task in a time $t+c$, where c=time spend to understand what was explained during the courses by the professor (self-education). Even if $c=v$ or $c<>v$, students chose to attend classes and to obtain information for homework solving during our face-to-face courses rather than to miss classes and to seek additional information themselves. In this way, students chose to spend less time for solving a homework task.

Another great benefit of using e-learning platforms is that students can access them from mobile devices. In this way, the student friendly environment can offer flexibility and convenience in use and the access to course

resources is not limited. Such a solution can also bypass the social phobia barriers, a problem that some students face. Their fear of public speaking can be overcome and a proper feedback may improve speaking skills and give the students the possibility to be correctly marked.

4. Conclusions

E-learning is a large and growing market with great potential in higher education. In order to maximize this potential, e-learning implementations should endeavour to satisfy the needs and concerns of all stakeholder groups as much as possible. To use technological tools in education proves to be a beneficial decision that can solve many problems in terms of human communication, creativity and reasoning.

Based on our study and experience, we consider that Moodle is a very good tool to supplement face-to-face teaching. Moodle is a cost-effective learning environment that, in our case, proved to be beneficial in terms of stimulating students' interest for homework tasks and their commitment in solving these tasks. It is also true that the professor needs to be well trained for e-learning platforms use and need to be involved in course development (and providing constructive feedback).

As an observation of our result and experience, we can say that those student who have attended classes and been actively involved in class activities, had a higher activity on the platform and received the highest grades. Instead, those with lack of class attendances and low activity on the platform received the lowest grades.

Therefore, we consider that using e-learning platforms in supporting face to face activities has a major positive impact.

As for the participants of this study it was the first contact with such a platform and we can say based on our results that it was a successful interaction. Curiosity and the desire to discover and learn new things were motivators for some of the students. We even can say that using different e-Learning tools the students would manifest a greater intrinsic motivation for learning.

In the future, we intend to use e-learning platforms for more classes. We also need to improve the feedback process because professor spends a lot of time in homework review and an optimal scale of correction can solve this issue. Overcrowding in homework tasks verification was produced, in some cases, because homework files were submitted very close to deadline. Also, a personal skin and theme with university logos for the e-learning platform may be used.

Similar to other technology applications, the success of e-Learning is dependent on the extent to which is satisfies the needs and addresses the concerns of its key stakeholders [19]. Therefore, it is highly recommended that before a certain change is done in a particular curriculum or course, to take into consideration all the stakeholders that are involved.

Data storing is considered a major problem as a class may generate huge files and at the end of a course the archive may exceed several GB for a single class. In this case, a hardware upgrade might be necessary or a file upload limit restriction should be activated.

All in all, using collaborative environment to support teaching represents a step forward. Giving and receiving feedback through the on-line environment proved to be a great step in responding to student needs and to a student centred education. The e-learning platform we have used is an adaptable and flexible tool with multiple modules that can be customized and adapted to a specific need. We intend to test several more modules and to adapt their usage to our faculty and course’s needs.

As a final conclusion, we encourage using e-Learning platforms in supporting teaching activities, homework task and evaluation process.

Acknowledgment

The research is financed by research centres: 1) Cercetare Dezvoltare Agora (R&D Agora) of Agora University of Oradea and 2) Mathematical Models and Information Systems, Faculty of Exact Sciences of Aurel Vlaicu

University of Arad.

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